Predicting Late-Season Emergence for Improved Giant Ragweed (*Ambrosia trifida*) Management in Ohio

Category: 09. WEED BIOLOGY AND ECOLOGY
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Variable late-season seedling emergence makes it difficult to know the optimum time to implement giant ragweed control and avoid crop yield loss in Ohio. Current giant ragweed seedling emergence models do not account for late-season emergence patterns characteristic of the eastern U.S. Corn Belt. Our objective was to develop a late-season seedling emergence model which can be integrated with early-season weed control recommendations. From 2000 to 2005, a 2x3x3 factorial experiment arranged in split-split-plot design was conducted in South Charleston, OH. Main-plot factor was tillage (till and no-till); subplot factor was crop (soybean, corn and fallow); and sub-subplot factor was post-plant weed control interval (weed-free full season, weed-free 300 to 800 growing degree days (intermediate), and weedy full season). To develop a seedling emergence model, giant ragweed seedlings were counted and removed weekly each growing season from 2000 to 2003. Cumulative percent seedling emergence was expressed as a function of hydrothermal time by two, successive Weibull models. The seedling emergence model was validated in 2005 within all crop environments and in 2006 at a separate location. The length of time a crop must be kept weed-free was determined with yield data from 2000 to 2003. Yields for intermediate weed control treatments were expressed relative to weed-free. Relationships between relative yields and weed control durations were summarized by Gompertz models which were validated in 2005. The seedling emergence model accurately predicted 90% of emergence occurred by June 12, 2005 (1142 hydrothermal days) and June 1, 2006 (1150 hydrothermal days). Weed-free intervals for 95% relative yield were 445 growing degree days for till corn, 490 growing degree days for till soybean and 530 growing degree days for no-till soybean. Since the seedling emergence model and weed-free intervals are on thermal time scales, they can be integrated to provide robust tools for giant ragweed management in Ohio.

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